SDK for APS Master Interface®
Version 5.0.0

User Manual

APS®, Automatic Payment Systems
January 2015

Revision Sheet

Release No.	Date	Revision Description
1.0	Feb 3rd, 2009	Initial Release
2.0	March 9th, 2011	APS Master Interface Version 3.0 is released with new features, drivers and software interface.
2.1	April 17th, 2012	Picture for Power Supply connection added. Picture for Error Message in Coin Acceptor added. Note added for 64 bit Operative Systems. Currenza Bill Validator picture added.
3.0	September 25th, 2014	Major document update from APS Master Interface Version 4.3.3 is released including Bill Dispenser and Hoppers Control. New driver released to support Windows 7 Professional Operative System.
4.0	January 5th, 2015	New APS Master Interface Version 5.0.0 Turn Key Solution for Credit Card processing, using EMV L1 and L2 certificated devices.

1.0 GENERAL INFORMATION

1.1 System Overview

The APS Master Interface® is a Multi-Protocol software that allows the connection of a Bill Validator, Coin Acceptor, Bill Dispeser and Coin Hoppers using the standard MDB Vending Protocol to a PC running Microsoft Windows XP or Windows 7 Professional. The APS Master Interface® is connected to one of the USB ports in the PC. The latest version of the ASP Master Interface® also integrates a "Turnkey Solution" for Credit Card processing using EMV L1 and L2 devices.

A Multidrop Bus (MDB) is a computer bus in which all components are connected to the same set of electrical wires. A process of arbitration determines which device gets the right to be the sender of information at any point in time. The other devices must listen for the data that is intended to be received by them.

Multidrop Buses are used by Vending Machine controllers to communicate with the vending machine's components. The APS Master Interface® opens the doors for a wide range of customized applications using a simple PC to control all the machine's components.

The Software Development Kit (SDK) for the APS Master Interface® includes all the drivers required to operate the equipment and also a Visual Basic sample code to speed up the learning process on creating new applications with this system.

1.2 Authorized Use Permission

Usage of the APS Master Interface® software is limited to its owner via the APS Terms and Conditions (26/08/2004).

1.3 Points of Contact

For additional information, APS Team can be contacted through our technical support email at techsupport@apsmx.com

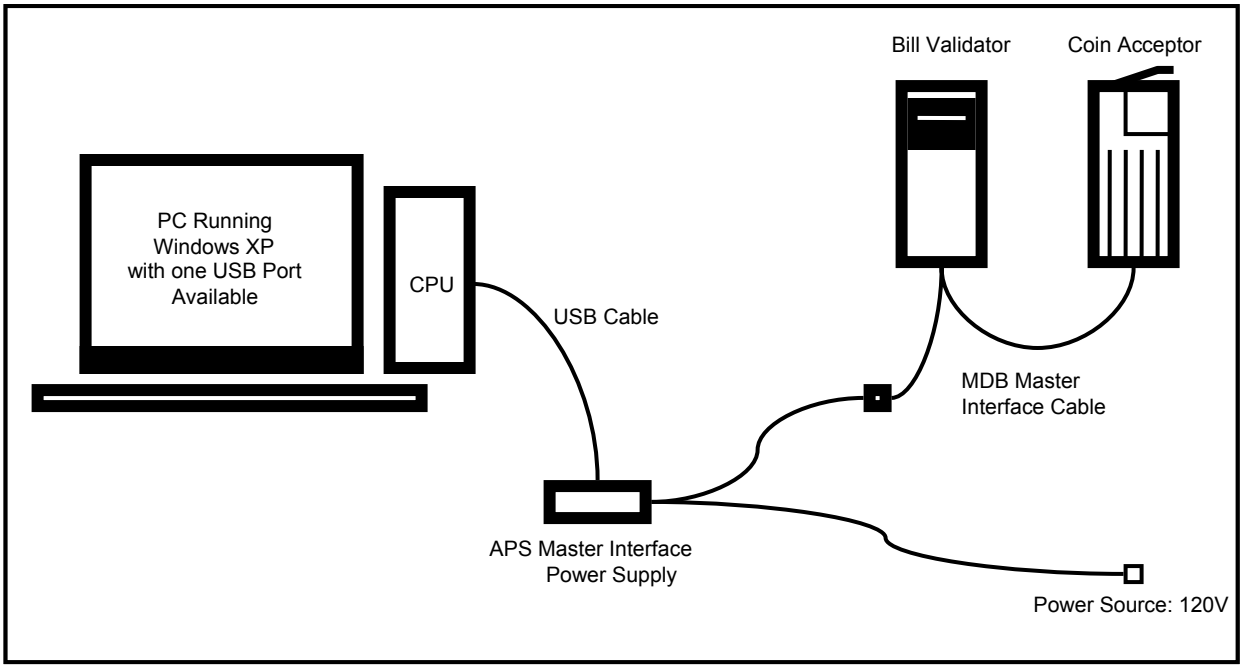
1.4 Acronyms and Abbreviations

MDB	Multidrop Bus
SDK	Software Development Kit
APS	Automatic Payment Systems
APSMI	APS Master Interface

2.0 SYSTEM SUMMARY

2.1 Hardware Configuration

The APS Master Interface® (APSMI) is configured to be connected to one available USB port in a PC Running Windows XP or Windows 7. Using the MDB Master Interface Cable it is possible to connect a Bill Validator and/or a Coin Acceptor.



The APSMI is powered up by the USB connection. An additional External Power Supply is required to power up the Bill Validator and/or Coin Acceptor.

The APSMI contains the electrical interface for MDB master, the device is compliant with the timing of the MDB 4.0 Specification. Some low level parts of the MDB communication is implemented directly on the interface microcontroller. This allow to meet the MDB timing specification and to control the mode bit of the MDB protocol.

To communicate with a MDB slave, we must use the MDB master of the interface. The timing and mode bit control is handled by the interface microcontroller. The full MDB Data Frame, including command and checksum, is send to the interface endpoint. The response of the MDB slave is then read from the interface endpoint.

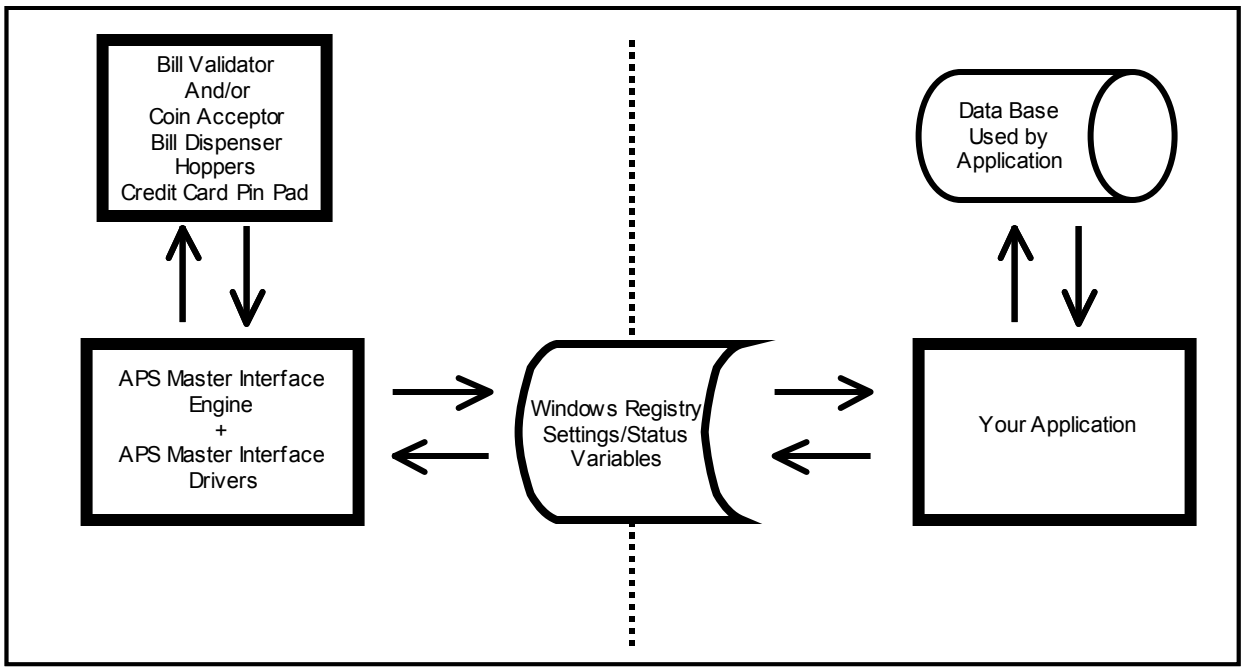
2.2 Software Configuration

APS Master Interface Software was developed to allow the interaction of any application written in any programming language that is able to communicate and change "Windows Registry" values in the Windows XP or Windows 7 Operative Systems.

APSMI Software consists on two different modules:

a) APS Master Interface Drivers: Used to control the APSMI Hardware via USB Port.

b) APS Master Interface Engine: Used to control the functions of the APSMI Hardware including the operation of one Bill Validator and/or one Coin Acceptor, Bill Dispenser, two Hoppers and a Credit Card Reader including its Pin Pad. The APSMI Engine is also the link that communicates those devices with Your Application using Windows Registry variables/values.



Windows Registry values are used to store APSMI Engine settings such as General Settings for Bill Validator and Coin Acceptor, type of bills to accept, value of the type of bills accepted, type of coins to accept, enable/disable delivery of change, etc.

The APSMI Engine must be initialized before the payment procedure starts. The APSMI Engine will run in the background waiting for the Application to trigger the payment process.

A typical Application consist on a software that request the user to provide an account number or a selection of a product, then the system connects to a Data Base to get the amount of money that the user will pay using the Bill Validator and/or Coin Acceptor and/or Credit Card.

Once the amount of money to be paid is defined, Your Application will write this value in a Windows Registry variable. The APSMI Engine continuously monitoring the Windows Registry variables will detect that the value to charge, will activate the Bill Validator and/or Change Acceptor and wait for the user to complete the payment.

While the APSMI Engine is receiving the payment from the user it will continue updating the Windows Registry variables with the due amount, the status of the equipments and the credit already paid. At the same time, your application will wait and monitor the Windows Registry variables until the payment is done, before continuing with the next step in the selling process.

You can also setup in Your Application a "Cancel" button, so the user is able to cancel the payment process at any time. This is also done using the Windows Registry variables communicating with the APSMI Engine.

Once the payment is done the APSMI Engine will calculate the difference between the due amount and the credit, and if necessary it will dispense the change using coins and/or bills.

2.3 Software License

Every APS Master Interface Hardware is sold with one license of the APS Master Interface Engine software. If you want to install the APSMI Engine in a different computer from the one that the APSMI will be used, you need to request a new license to APS.

If you have any questions regarding our License Policy please contact us (Use contact information provided in Section 1.3 of this Manual).

2.4 System Requirements

Before you install your APS Master Interface Engine software, please make sure your computer meets the following minimal system requirements:

- Microsoft(R) Windows XP(R) Professional with SP2 or Windows 7 Professional (32bits)
- Intel(R) Pentium(R) Processor (1.73 GHZ)
- 1 LAN Network Port
- 1 Universal Serial Bus for MDB devices (USB 2.0)
- 1 Universal Serial Bus for Coin Hopper (Optional)
- 1 Universal Serial Bus for Credit Card Pin Pad (Optional)
- 1 RS232 Port for Bill Dispenser (Optional)

Note: The APS Master Interface Engine doesn't support 64bit Operative Systems.

2.5 Hardware and Software Compatibility for MDB Devices

As we continue looking to increase the amount of Bill Validators and Change Acceptors tested with our APS Master Interface we can say that most of the MDB protocol devices are compatible with our equipment with minor adjustments.

With the development of the APS Master Interface Engine now you are able to configure each Brand and Model according to the factory settings preloaded in every equipment. If for any reason you need to change the Brand of the equipment used, you can easily do it using the APSMI Engine Console to update your settings.

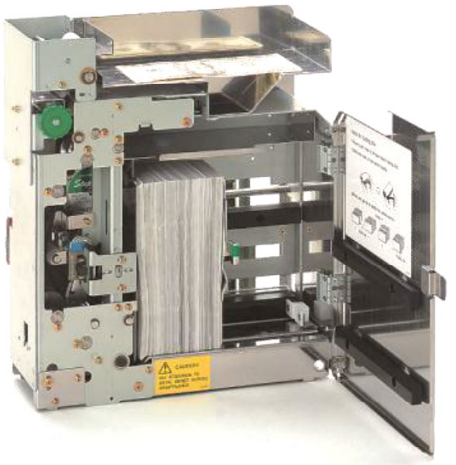
Here is the list of Coin Acceptors and Bill Validators successfully tested by APS:

 Change Acceptor Brand: MEI Model: Cashflow 7000 Protocol: MDB	 **Change Acceptor** Brand: MEI Model: Cashflow 690/691 Protocol: MDB	 **Change Acceptor** Brand: COINCO Model: GLOBAL MXPF703 Protocol: MDB
 Bill Validator Brand: CashCode Model: Backload Validator Protocol: MDB	 **Bill Validator** Brand: ICT Model: TAO V MXP4 Protocol: MDB	 **Bill Validator** Brand: CashCode Model: Currenza Protocol: MDB

If you have a different equipment not listed in this table, please feel free to contact our Technical Support Staff to get the latest information on tested equipment (Use contact information provided in Section 1.3 of this Manual).

2.6 Hardware Compatibility for Bill Dispensing

The APS Master Interface allows the connection of one Bill Dispenser to provide change to the users. The Bill Dispenser is connected directly to the RS232 port in the PC.



Bill Dispenser
Brand: Fujitsu
Model: F50
Protocol: RS232

2.7 Hardware Compatibility for Coin Hoppers

The APS Master Interface Software allows the control of two Coin Hoppers to provide change to the users. The connection requires an additional USB port in the PC and additional hardware (APS Hoppers Interface).

Coin Hopper
Brand: AZKOYEN
Model: U II
Protocol: Parallel

2.8 Hardware Compatibility for Credit Card Processing

The APS Master Interface Software allows the Credit Card Processing using EMV L1 and L2 Devices. We have developed our software and certified the following devices:

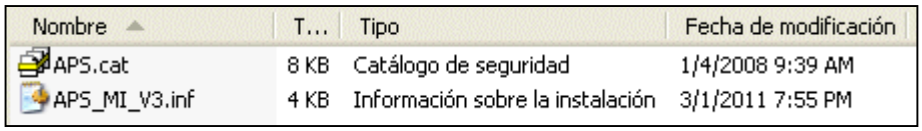
POS Credit Card Pin Pad Brand: Verifone Model: VX820 Protocol: USB	**Unattended Card Reader and Pin Pad** Brand: Ingenico Model: iSelf Protocol: USB

3.0 GETTING STARTED

3.1 Installation Files and Folders

3.1.1.1 APS_Master_Interface_Driver_V3.0 Folder for Windows XP

The APS Master Interface hardware requires USB drivers to work with your computer, those files are distributed in the **APS_Master_Interface_Driver_V3.0** folder containing 2 files that you will need once the Interface is connected for the first time to your computer's USB port (Details on how to install the Interface will be described in the next chapters).



Nombre	T...	Tipo	Fecha de modificación
APS.cat	8 KB	Catálogo de seguridad	1/4/2008 9:39 AM
APS_MI_V3.inf	4 KB	Información sobre la instalación	3/1/2011 7:55 PM

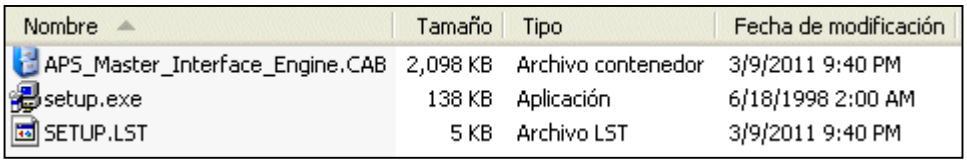
3.1.1.2 APS_Master_Interface_Driver_Windows7 Folder for Windows 7

The APS Master Interface hardware requires USB drivers to work with your computer, those files are distributed in the **APS_Master_Interface_Driver_Windows7** folder containing 2 files that you will need once the Interface is connected for the first time to your computer's USB port (Details on how to install the Interface will be described in the next chapters).

Name	S...	Type	Date Modified
APS.cat	8 KB	Security Catalog	14/11/08 4:18 PM
APS_MI_V3_W7.inf	4 KB	Setup Information	18/05/14 8:09 AM

3.1.2 APS_Master_Interface_Engine_V5.0.0 Folder

The APS Master Interface Engine is the main application that will be used to setup the parameters and also is used to run in the background to communicate with your application and control the functions of the Bill Validator and/or Coin Acceptor. The installation files are distributed in the **APS_Master_Interface_Engine_V5.0.0** folder where you will find the following files (Details on how to install the APS Master Interface Engine will be described in the next chapters).



Nombre	Tamaño	Tipo	Fecha de modificación
APS_Master_Interface_Engine.CAB	2,098 KB	Archivo contenedor	3/9/2011 9:40 PM
setup.exe	138 KB	Aplicación	6/18/1998 2:00 AM
SETUP.LST	5 KB	Archivo LST	3/9/2011 9:40 PM

3.1.3 SDK_APS_Master_Interface_V5.0.0 Folder

The SDK for APS Master Interface is distributed in a folder containing a sample application that will help you to develop your own applications (**SDK_APS_Master_Interface_V5.0.0** Folder), where you will find the following files:

Nombre	Ta...	Tipo	Fecha de modificación
APS_Master_Interface_Engine.exe	216 KB	Aplicación	3/2/2011 6:26 PM
Main.frm	6 KB	Visual Basic Form File	3/9/2011 9:48 PM
SDK_APS_Master_Interface.exe	24 KB	Aplicación	3/9/2011 9:48 PM
SDK_APS_Master_Interface.vbp	1 KB	Visual Basic Project	3/9/2011 9:48 PM

3.1.3.1 APS_Master_Interface_Engine.exe

As mentioned before, the APS_Master_Inteface_Engine.exe is the main application that controls all the functions of the Bill Validator, Coin Acceptor, Bill Dispenser, Coin Hoppers and Credit Card Processing. Please note that this file might not run properly if the installation is not completed correctly as it will be described in the next chapters.

This executable file requires several additional components that normally are not installed in a regular Windows XP environment. If you start this application prior to the installation of the files, it will return an error message related to the missing components.

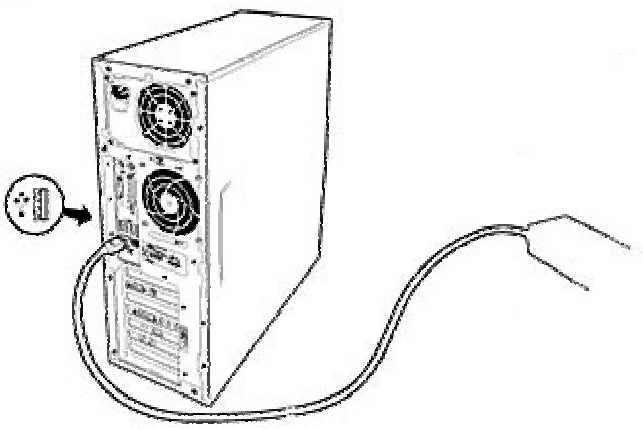
3.1.3.2 SDK_APS_Master_Interface.vbp

SDK_APS_Master_Interface.vbp is a sample application written in Microsoft(R) Visual Basic 6.0 to demonstrate the use of the APSMI Engine. Feel free to modify the source code to integrate it to your application.

3.2 Installing the APS Master Interface

3.2.1 Connecting the Interface and Installing the Drivers

After you uncompressed the drivers in your computer follow the next steps to Install your APS Master Interface for the first time:



1. Connect the APS Master Interface to your computer using an USB Cable.

Note: At this stage it is not necessary to connect the MDB Master Cable to your Bill Validator and/or Coin Acceptor.

The APS Master Interface hardware is powered up directly from the USB port so it is not necessary to connect the power supply neither.

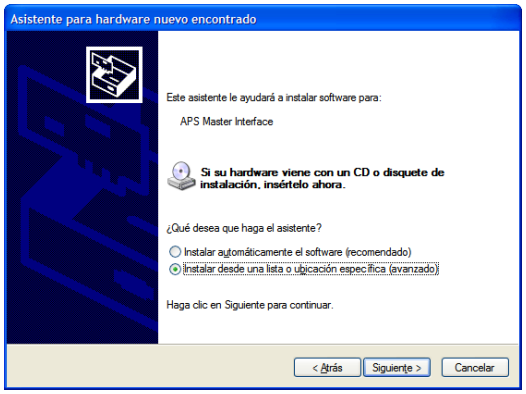
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

2. Windows XP or Windows 7 will detect your new hardware and start the "Found New Hardware Wizard".

Select the "No, not this time" option.

Click the "Next >" button.

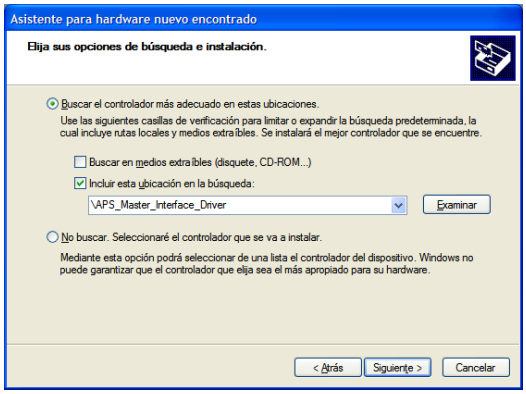
Note: If Windows 7 installs the driver automatically, you will need to reinstall it later using the Device Manager on the Control Panel Menu.


Asistente para hardware nuevo encontrado
Este asistente le ayudará a instalar software para:
APS Master Interface
Si su hardware viene con un CD o disquete de instalación, insértelo ahora.
¿Qué desea que haga el asistente?
Instalar automáticamente el software (recomendado)
Instalar desde una lista o ubicación específica (avanzado)
Haga clic en Siguiente para continuar.
< Atrás
Siguiente >
Cancelar

3. The wizard will show the name of the "APS Master Interface" and ask if you have the installation files.

Select the "Install from a list or specific location (Advanced)" option.

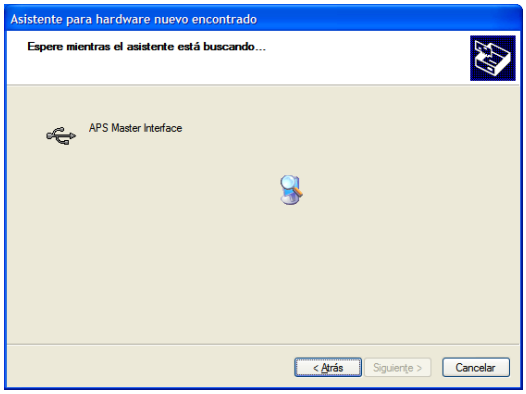
Click the "Next >" button.


Asistente para hardware nuevo encontrado
Elija sus opciones de búsqueda e instalación.
Buscar el controlador más adecuado en estas ubicaciones.
Use las siguientes casillas de verificación para limitar o expandir la búsqueda predeterminada, la cual incluye rutas locales y medios extraíbles. Se instalará el mejor controlador que se encuentre.
Buscar en medios extraíbles (disquete, CD-ROM...)
Incluir esta ubicación en la búsqueda:
\APS_Master_Interface_Driver
Examinar
No buscar. Seleccionaré el controlador que se va a instalar.
Mediante esta opción podrá seleccionar de una lista el controlador del dispositivo. Windows no puede garantizar que el controlador que elija sea el más apropiado para su hardware.
< Atrás
Siguiente >
Cancelar

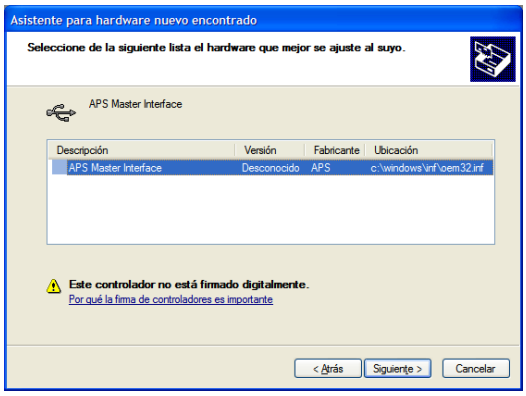
4. The wizard will ask you to choose your search and installation options.

Select "Search for the best drivers in this locations." and disable "Search removable media (floppy, CD-ROM...)".

Select "Include this location in the search:" then click the "Browse" button to find the folder "APS_Master_Interface_Driver_V3".



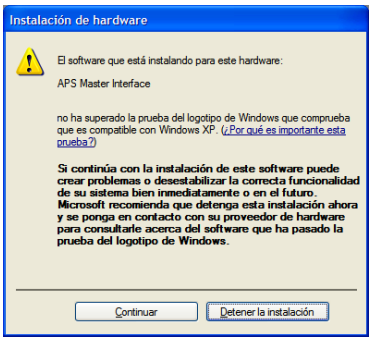
5. The wizard will search for the APS Master Interface drivers in the selected folder.



6. If the destination folder was selected correctly the wizard will show the "APS Master Interface" driver.

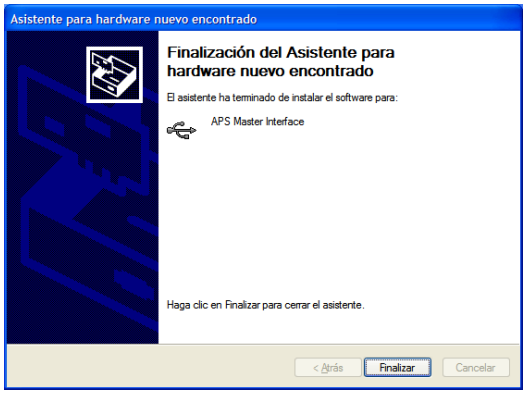
Select the "APS Master Interface".

Click the "Next >" button.


Instalación de hardware
El software que está instalando para este hardware:
APS Master Interface
no ha superado la prueba del logotipo de Windows que comprueba que es compatible con Windows XP. (¿Por qué es importante esta prueba?)
Si continúa con la instalación de este software puede crear problemas o desestabilizar la correcta funcionalidad de su sistema bien inmediatamente o en el futuro. Microsoft recomienda que detenga esta instalación ahora y se ponga en contacto con su proveedor de hardware para consultarle acerca del software que ha pasado la prueba del logotipo de Windows.
Continuar
Detener la instalación

7. You will receive a notification stating that the APS Master Interface "has not passed Windows Logo testing to verify its compatibility with Windows XP".

Ignore the message and click the "Continue Anyway" button.

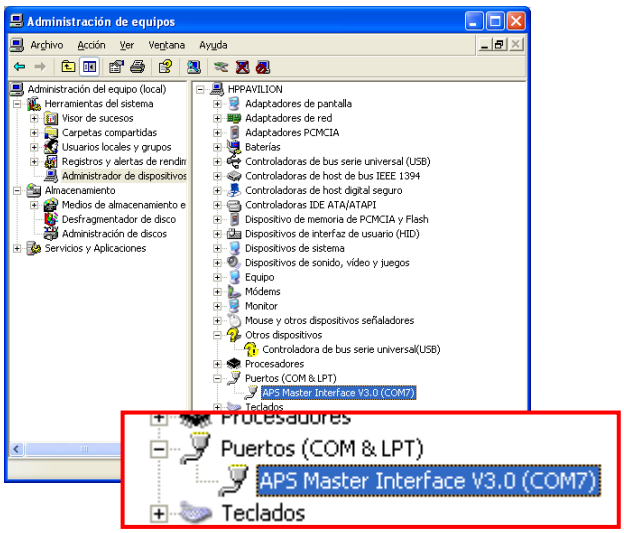

Asistente para hardware nuevo encontrado
Finalización del Asistente para hardware nuevo encontrado
El asistente ha terminado de instalar el software para:
APS Master Interface
Haga clic en Finalizar para cerrar el asistente.
< Atrás
Finalizar
Cancelar

9. Congratulations! now your APS Master Interface is installed and ready to use.

Click "Finish".

3.2.2 Checking the correct installation of the APS Master Interface

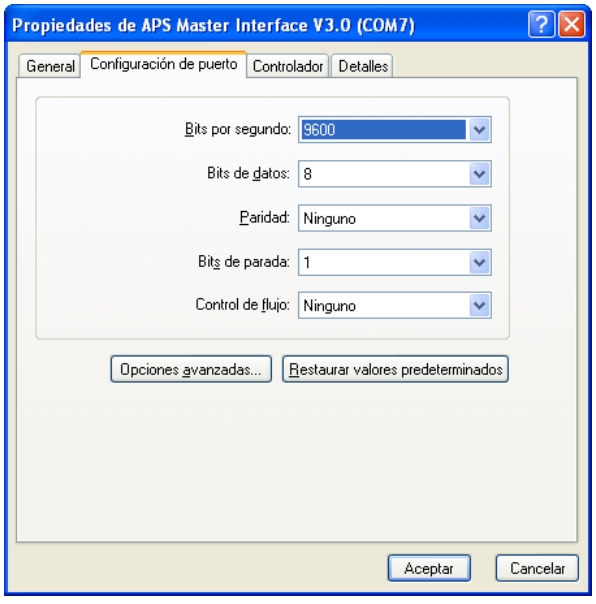
At this point, you already installed the drivers that will be used to control the APS Master Interface. You can check if the drivers were installed correctly by following the next steps:



1. Using the Control Panel go to the "Components Manager", then look for the "Ports (COM & LPT)" section. If the APS Master Interface was correctly installed you will find it there.

The COM port between parentheses indicates the port number where the APS Master Interface is currently connected. If you change to another port this number will be updated.

Note: In Windows 7 the name of the driver will be shown as:
APS Master Interface V3.0 for W7
If this legend is read differently then the driver was installed incorrectly and will need a reinstallation.



2. Right click on the APS Master Interface icon and select "Properties.

Look for the "Port Configuration" tab and make sure the parameters are setup like the image on the left.

3.3 Installing the APS Master Interface Engine

As we explained before the APS Master Interface Engine (APSMI Engine) is the main software that will be used to setup the parameters of the Bill Validator and/or Coin Acceptor. Once your application is operating, the APSMI Engine will be running in the background to communicate with your application and control the equipment connected to the interface.

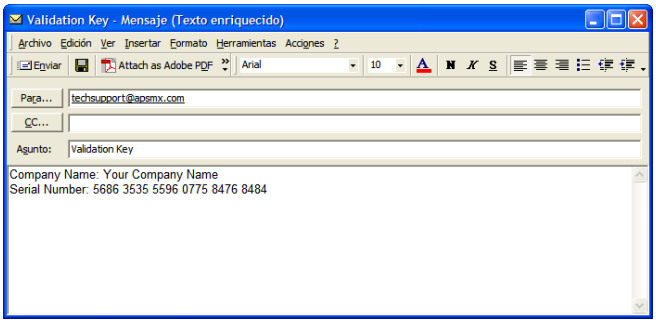
IMPORTANT: The APSMI Engine license can be used in only one computer. If you need to install the APSMI Engine in a different computer you need to buy a new license (Please refer to chapter 2.3 for more details on this matter). Once the software is installed, you cannot uninstall and install it again in a new computer.

1. Find the "Setup.exe" file inside the **APS_Master_Interface_Engine_V5.0.0** folder and double click on it. Follow the instructions from the install wizard until the application is fully installed.

2. Find the “APS Master Interface Engine V5.0.0” in the Start Menu and click on it.

3. You will receive a warning message indicating that your copy of the software is not registered yet: "APS Software Not Registered".

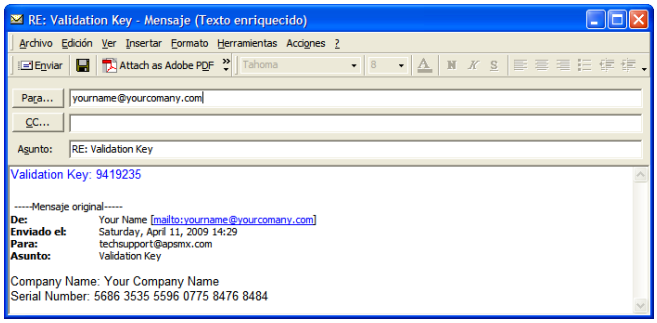
The APSMI Engine software will generate an unique Serial Number for your computer.



4. Send an email to APS requesting your Validation Key (email address can be found in chapter 1.3).

Write the name of your Company.

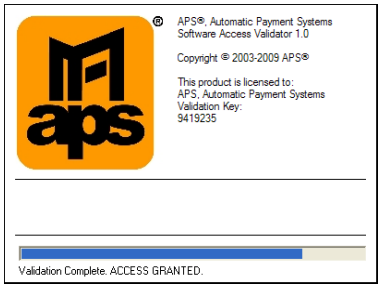
Copy and paste the Serial Number into the body of your message.



5. You will receive an email back from APS with your Validation Key number.

6. Once you get the Validation Key you will need to open the APSMI Engine again, once you get to the "APS Software Not Registered" screen write your Company Name and Validation Key in the appropriate text boxes.

Click the "Save" button (The screen will be closed).



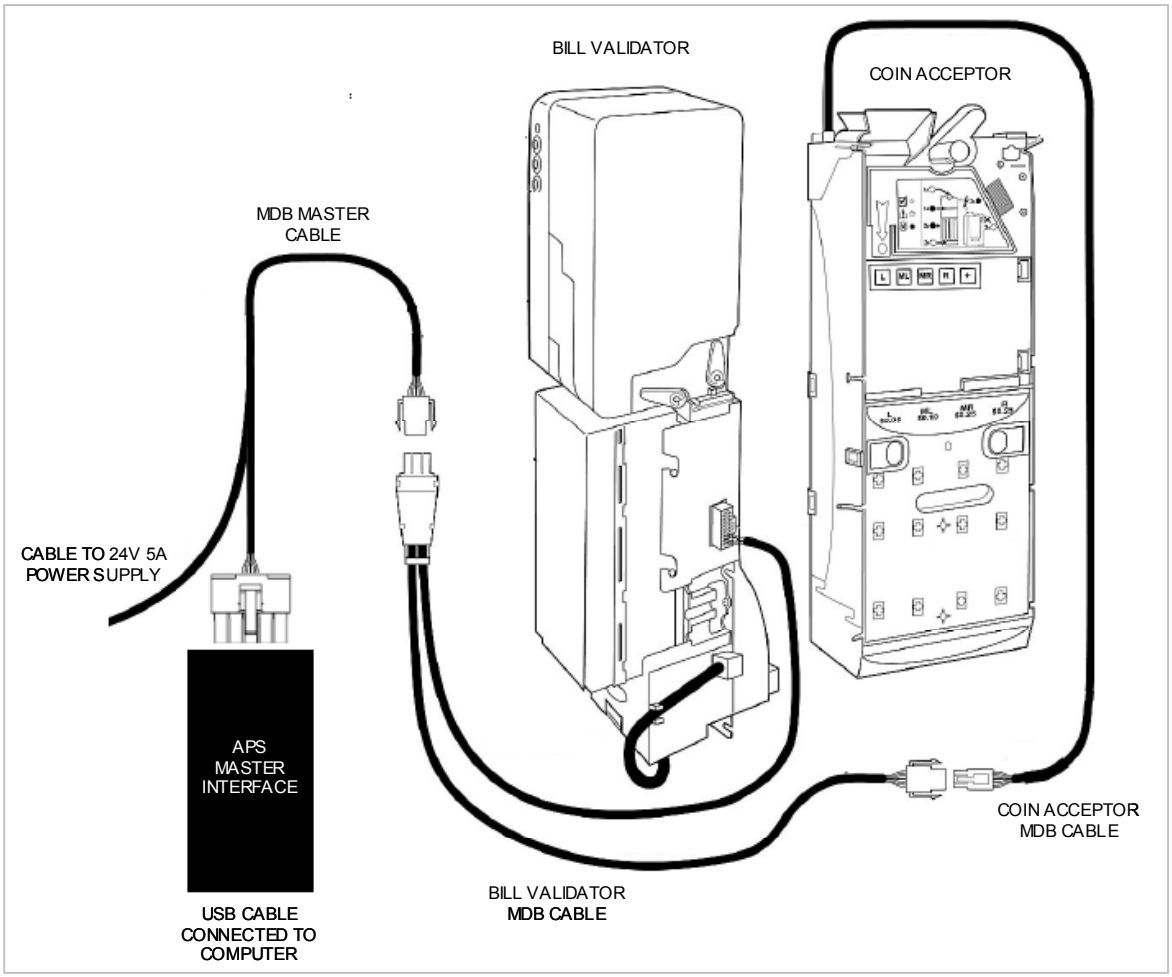
7. In the next chapters you will learn that there are two methods of opening the APSMI Engine. One is by double clicking in the .exe file and the second is calling it directly from the Command prompt (used to run the application in the background).

Regardless of the method you use, if you Registered your software correctly, you will see this screen every time you run the APSMI Engine application.

3.4 Connecting the Bill Validator and/or Coin Acceptor

Once you have installed your APS Master Interface Engine software and registered it you are ready to connect the Bill Validator and/or Coin Acceptor to you APS Master Interface. As we mentioned before, the APSMI will get the power from the USB connection. You will need a Power Supply for the Bill Validator and/or Coin Acceptor (Power requirements change between different brands, usually a 24V to 36V @ 4A power supply should work with your MDB devices).

Please follow the picture bellow as a guide to connect your equipments to the APSMI. You can use a stand alone Coin Acceptor or Bill Validator. In case you want to use both equipments, first you must connect your Bill Validator to the MDB Master Cable and then use the built in cable to connect your Coin Acceptor as it is shown in the picture bellow.



Some equipment have to be configured to support the MDB protocol. Please make sure your equipment meet this requirement before connecting it to the APSMI. If your equipment is already included in the list of equipment tested by APS (Chapter 2.5) and you need additional information on how to set it up, please feel free to contact us to support you on this task.

3.4.1 MEI Cashflow7000 Coin Acceptor Error Message

After power connection of the MEI Cashflow7000 Coin Acceptor, you will notice an error message ("Revisar maq. – Err. de comunicación") in the display. This error message is completely normal and doesn't affects the functionality of the system.

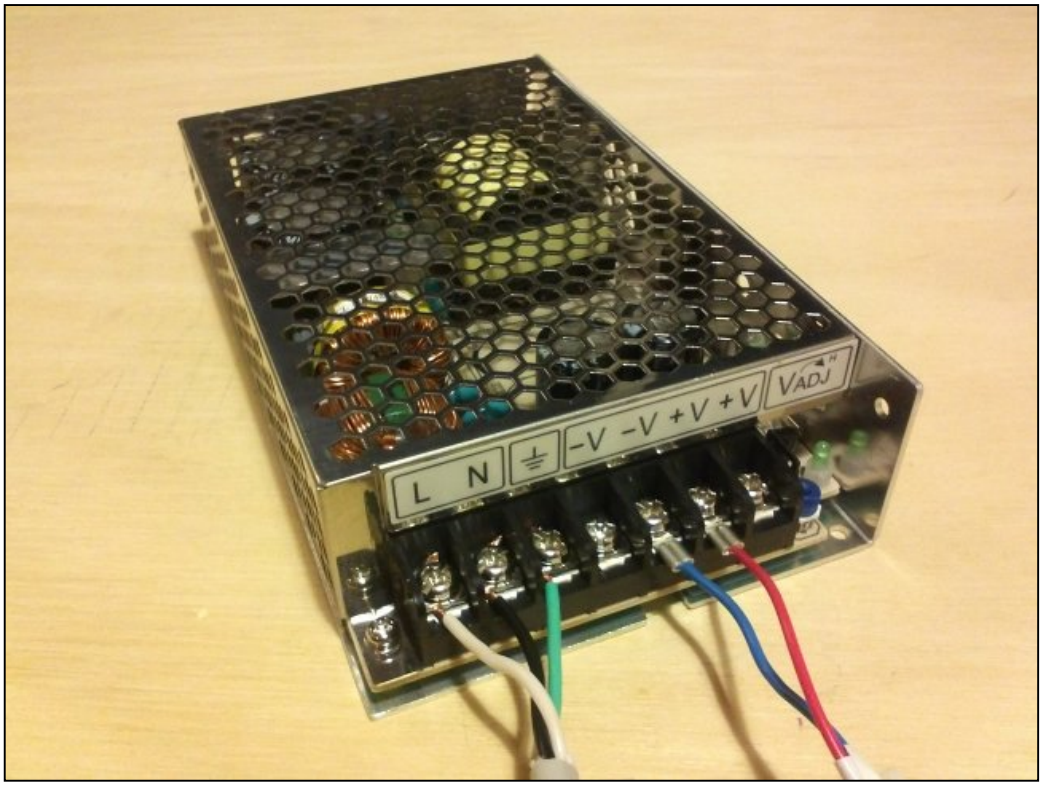
In a regular Vending Machine environment the main controller is constantly communicating the Coin Acceptor to receive coins at any time, so the device is always available to receive coins. If the equipment is disconnected or stops receiving polls from the main controller the equipment shows the indicated error message, once the communication is establish again the message disappears.

Working with the APS Master Interface environment is different, there is not communication or polling between the software and the Coin Acceptor while there are not any operation in progress. When there is a need to charge an amount, the Coin Acceptor will be activated and then the error message will disappear while the payment is in progress. Once the transaction is done, the error message will appear once again.

.

3.4.2 APS Master Interface – Power Supply Wires Connection

The APS Master Interface integration kit includes a 24V power supply to connect the Bill Validator and Coin Acceptor. The following pictures shows how to correctly connect them.



Reference for B&W printing:

White Cable >> L
Black Cable >> N
Green Cable >> Ground
Blue Cable >> V-
Red Cable >> V+

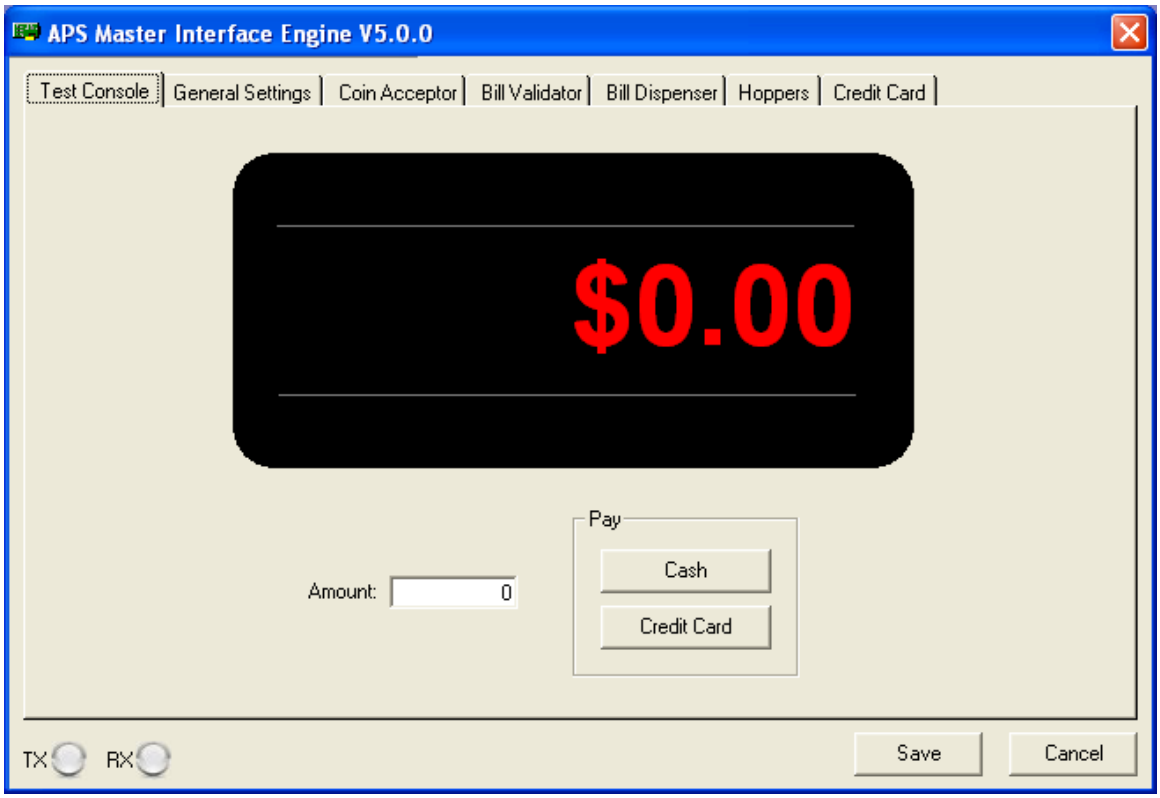
4.0 USING THE SOFTWARE

The APS Master Interface Engine software has two operating modes: APS Master Interface Engine Console (Used to setup parameters, debug your application and test Bill Validator and/or Coin Acceptor) and the APS Master Interface Engine Hide (Used to control the Bill Validator and/or Coin Acceptor while your application is running. In this mode the APSMI Engine will be running in the background and won't be visible to the user).

4.1 APS Master Interface Engine Console

Before starting the APS Master Interface Engine Console make sure your APS Master Interface, Bill Validator and/or Coin Acceptor are connected and powered.

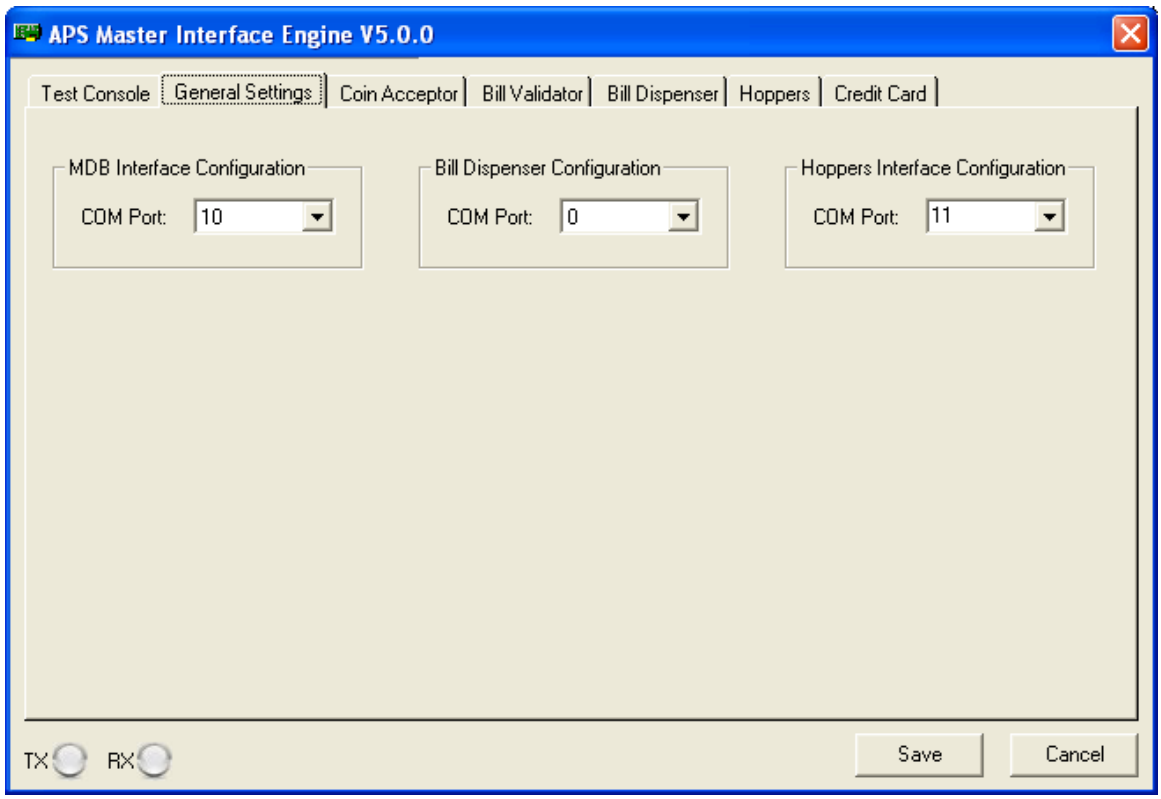
To start the APSMI Engine Console you just need to double click on the file APS_Master_Interface_Engine.exe or open it directly from Start Menu and you will see the following screen:



The APSMI Engine Console is divided into seven sections: Test Console, General Settings, Coin Acceptor, Bill Validator, Bill Dispensers, Hoppers and Credit Card. In the following chapters we will describe in detail every single one.

4.1.1 General Settings

The APSMI Engine V5.0.0 General Settings tab includes the MDB devices port, the Bill Dispenser port and the Hoppers Interface port. Both MDB and Hoppers Interface ports are USB while the Bill Dispenser port is a RS232.



If you don't know what COM Port has been assigned to the APS Master Interface, follow the steps on Section 3.2.2 ("Checking the correct installation of the APS Master Interface").

If you select a wrong Port or the APS Master Interface is not connected properly to that Port you will receive an Port Error message asking you to select another Port.

The Error message will disappear when you have selected the correct Port and the communication is established between your computer and the APS Master Interface.

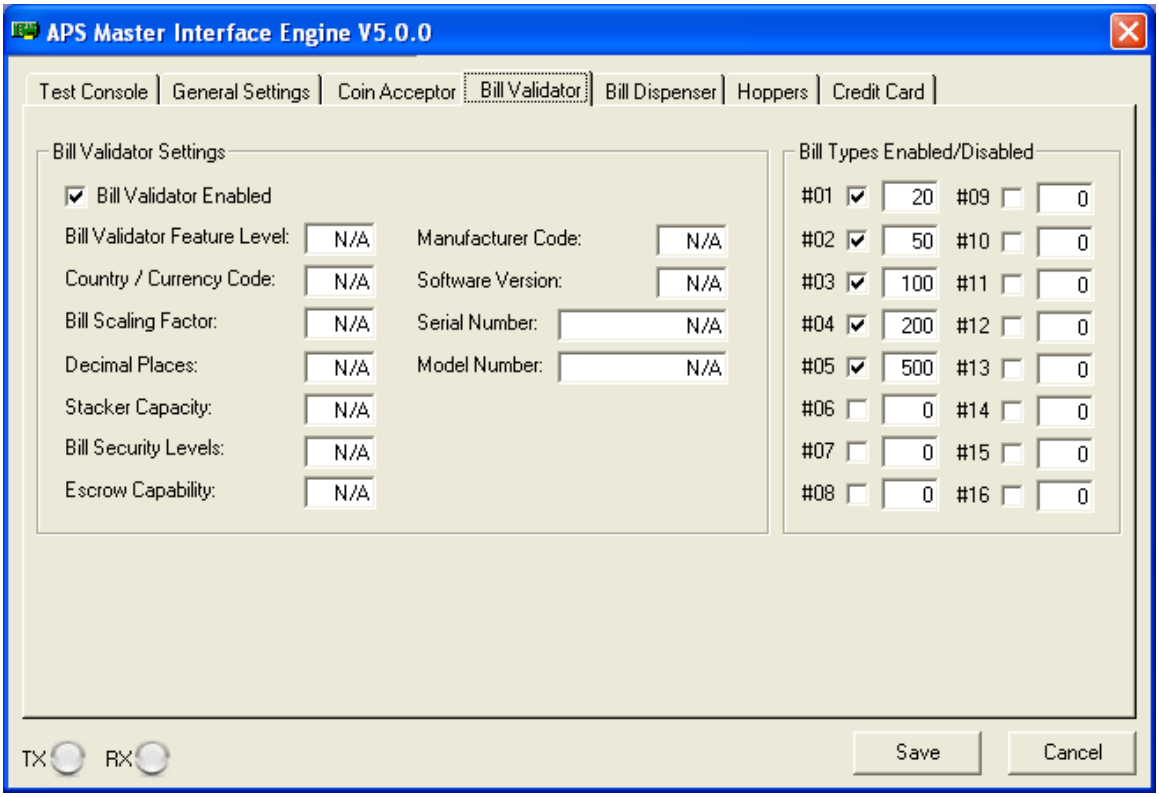
If you have a computer that doesn't meet the specification described in chapter 2.4, please contact us to help you to define the best parameters for your system (Please note that not all the systems will work with the APSMI).

If you make changes to the General Settings you need to press the "Save" button so they are available next time you run the APSMI Engine Console.

4.1.2 Bill Validator Settings

Bill Validator Settings are used to enable/disable the use of a Bill Validator and also to specify the value of a bill assigned to each type.

Click on the Bill Validator Enabled checkbox to activate/deactivate the Bill Validator.



MDB protocol requires Bill Validators to send the "Bill Type" inserted by the user when the equipment is operating. There are 16 different types of bill supported by the MDB protocol.

The "Bill Type" is a number from 1 to 16. Each Bill Validator manufacturer has different assignments for the value of the "Bill Type". This setting must be updated manually once you have the right value for each type of bill.

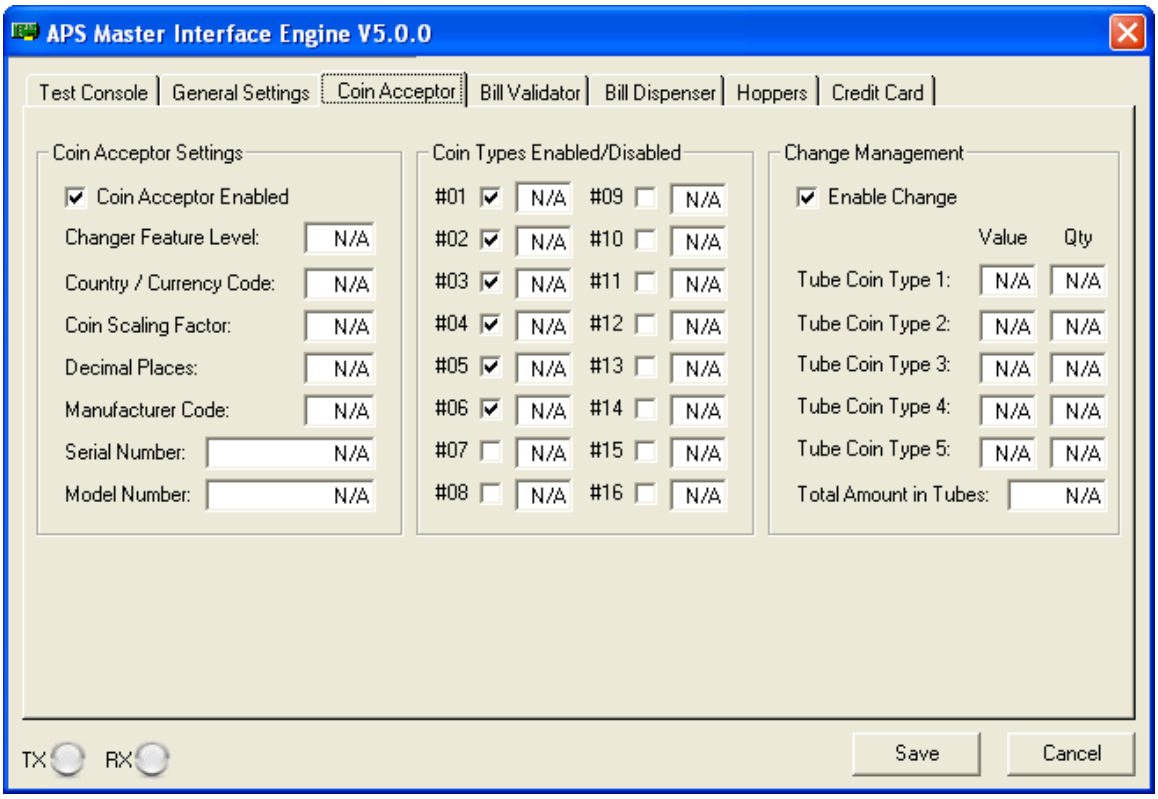
Default values for the Bill Validator Settings were defined using an ICT Bill Validator where the "Bill Type" number 01 is not used, number 02 is 20 pesos, etc... "Bill Type" from number 06 to number 16 are not used in this type of Bill Validator.

You can disable the use of a "Bill Type" by clicking in the checkbox next to it. Don't forget to click "Save" if you want to keep your changes.

All the fields showing a N/A value will be updated automatically once the Bill Validator is activated an has established the communication with the APS Master Interface.

4.1.3 Coin Acceptor Settings

Coin Acceptor Settings are used to enable/disable the use of a Coin Acceptor and also to specify the type of coins to be used. Please note that unlike the Bill Validator in the Coin Acceptor is not possible to assign the value to each type of coin. This information is already programmed in the Coin Acceptor and will be communicated to the APSMI Engine once the equipment is activated and has established communication with the APS Master Interface.



To enable/disable the use of a coin, just click on the checkbox next to the "Coin Type" number.

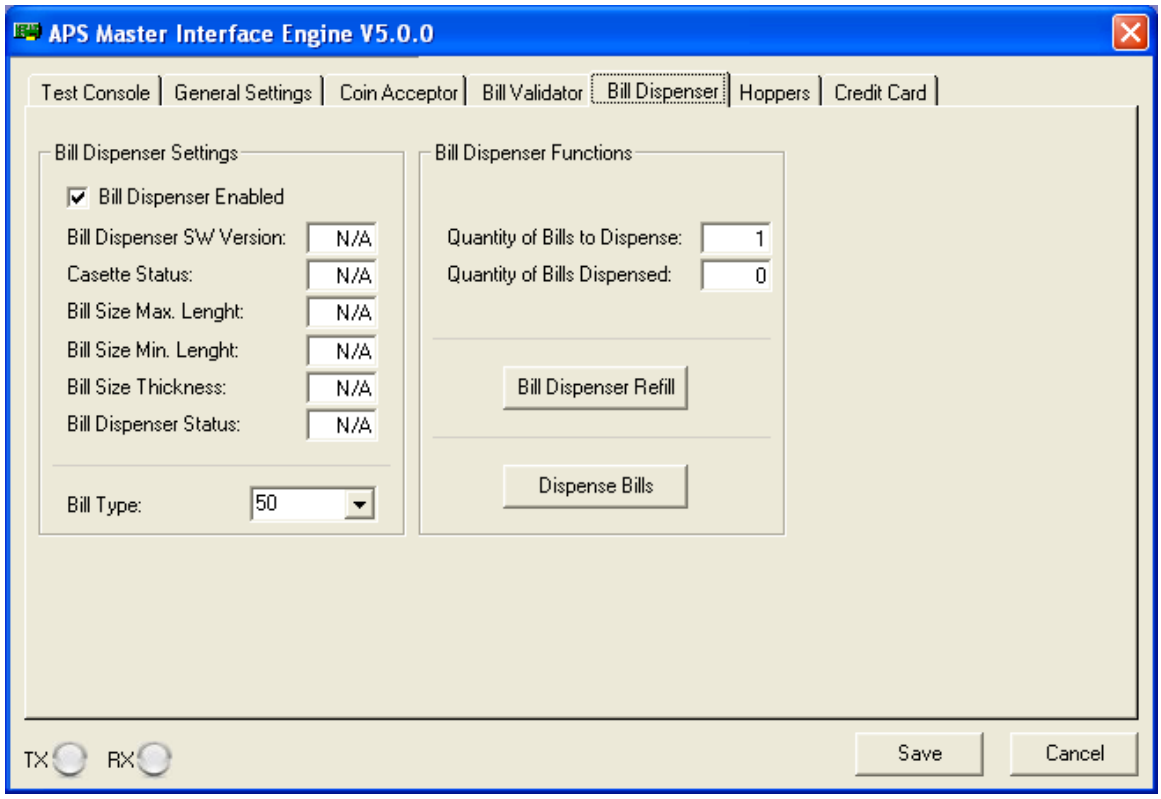
From Version 3.0 of the APSMI Engine Console until the latest versions is possible to get the actual value of the coins programmed in the Coin Acceptor, also is possible to know the exact quantity of coins in the tubes, their values and the total amount in those tubes. These features were not available in previous versions.

If you want to dispense change automatically using your Coin Acceptor, Bill Dispenser and Coin Hoppers you just need to activate the function by clicking in the "Enable Change" checkbox. **Please note that "Enable Change" is a global setting that will enable or disable the Bill Dispenser and Coin Hoppers automatic change.**

All the fields showing a N/A value will be updated automatically once the Coin Acceptor is activated an has established communication with the APS Master Interface.

4.1.5 Bill Dispenser Settings

Bill Dispenser Settings are used to enable, disable, test and refill the equipment. Connect your Bill Dispenser to an available RS232 Port in your PC, then go to the "General Settings" tab and select the "COM Port" being used under the "Bill Dispenser Configuration" section. If the connection is not possible, it will display an error message asking you to select the right Port. Don't forget to click "Save" to make the changes permanent.



If you want to dispense change using Bills go to the "Bill Dispenser" tab and click on the "Bill Dispenser Enabled" checkbox under the "Bill Dispenser Settings" section, if there everything is working correctly all the fields with "N/A" values will be updated.

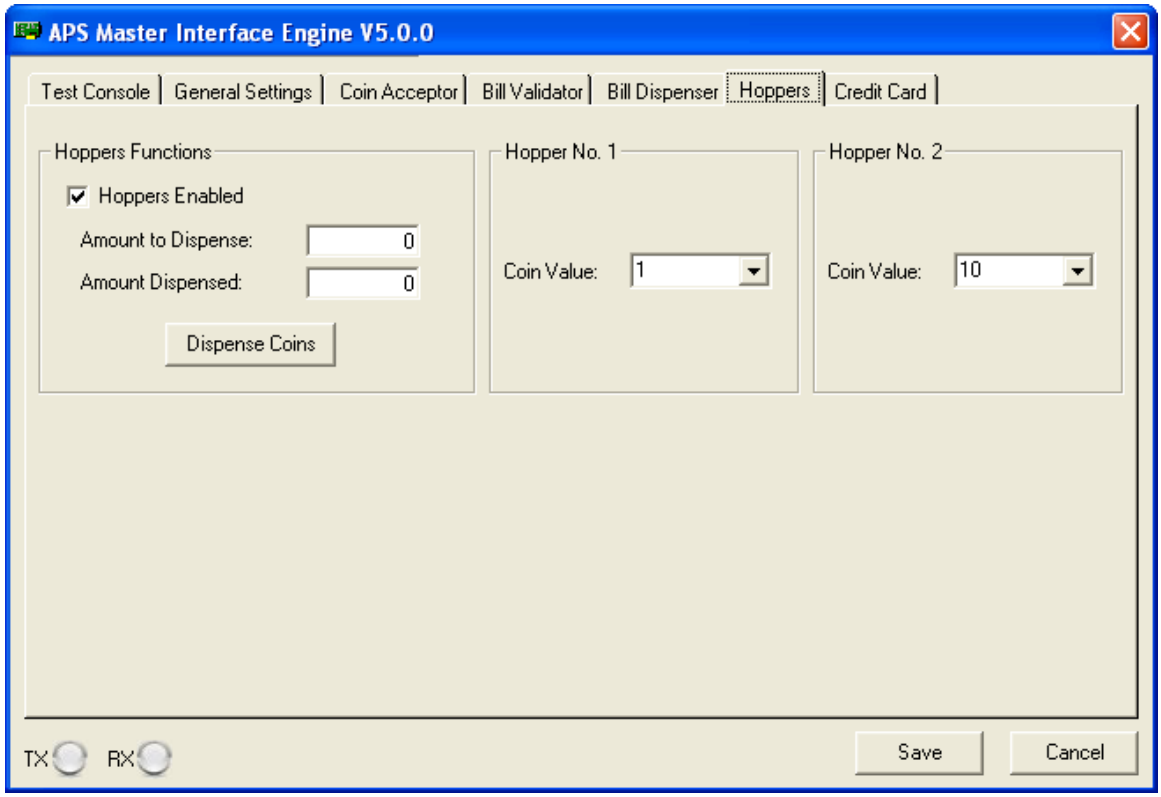
By default the APS Master Interface Engine will set the "Bill Type" to $50, you can always change this value to any of the options available in the menu. Please note that the Bill Dispenser is not able to identify the type of bill you are using, so it will dispense the notes considering the value you selected here.

You can test the Bill Dispenser typing the quantity of bills you will like to dispense in the "Quantity of Bills to Dispense" field under the "Bill Dispenser Functions" section. Then click on the "Dispense Bills" and the equipment will be activated to dispense the quantity selected and report the actual quantity dispensed in the "Quantity of Bills Dispensed" field. If the Bill Dispenser is empty it will update the "Bill Dispenser Status" to "NOK" value. Once you have loaded the Bill Dispenser you must to click "Bill Dispenser Refill" to override the status.

4.1.6 Hoppers Settings

Hoppers Settings are used to enable, disable and test up to two Coin Hoppers. In order to use these devices with the APS Master Interface Engine you will need an additional hardware: "APS Hoppers Interface", the one you will connect to an available USB port in the PC.

Once you have connected the "APS Hoppers Inteface" to the PC go to the "General Settings" tab and select the "COM Port" being used under the "Hoppers Interface Configuration" section. If the connection is not possible, it will display an error message asking you to select the right Port. Don't forget to click "Save" to make the changes permanent.



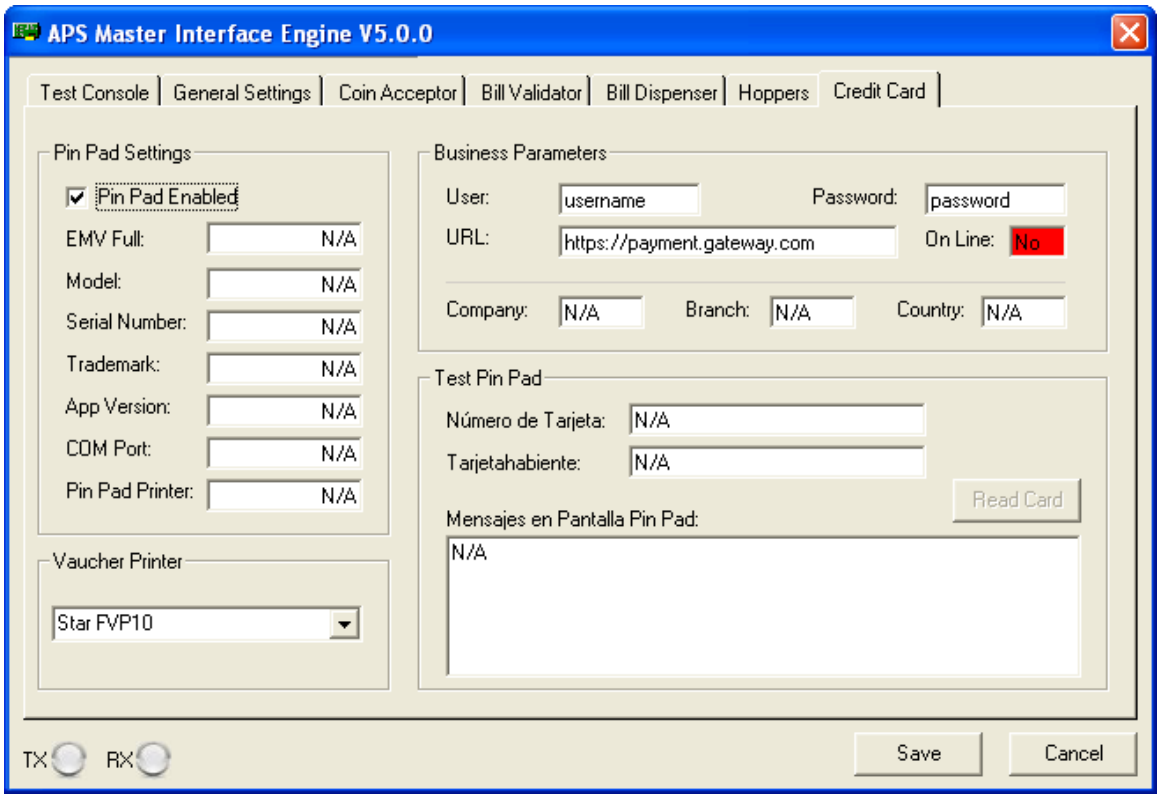
If you want the APS Master Interface Engine to use the Coins Hoppers to dispense change, first you need to check the "Hoppers Enabled" checkbox under the "Hoppers Functions" section, then you need to select the "Coin Value" that you will be using under the "Hopper No. X" sections. If for any reason you want to disable an individual hopper but still using the other you can do it by selecting a "Coin Value" of "0".

To test the configuration you can type the amount of money to dispense in the "Amount to Dispense" field under the "Hoppers Functions" section and then click "Dispense Coins". The APS Master Interface Engine algorithm will try to dispense the higher coin value and then use the lowest one to complete the change. At the end of the operation it will report the actual amount dispensed in the "Amount Dispensed" field under the "Hoppers Functions" section.

4.1.7 Credit Card Settings

Credit Card payments processing is offered by APS as a "Turnkey Solution" only. If you are interested in processing Credit and Debit Card transactions using VISA, Master Card and American Express please contact us via email at ventas@apsmx.com

Once you have completed our setup process you will receive a EMV certified Pin Pad terminal that will be used by the APS Master Interface Engine to process the payments. You will also get a User, Password and secure URL. Those values will be used to fill their fields under the Business Parameters section of the Credit Card Tab.



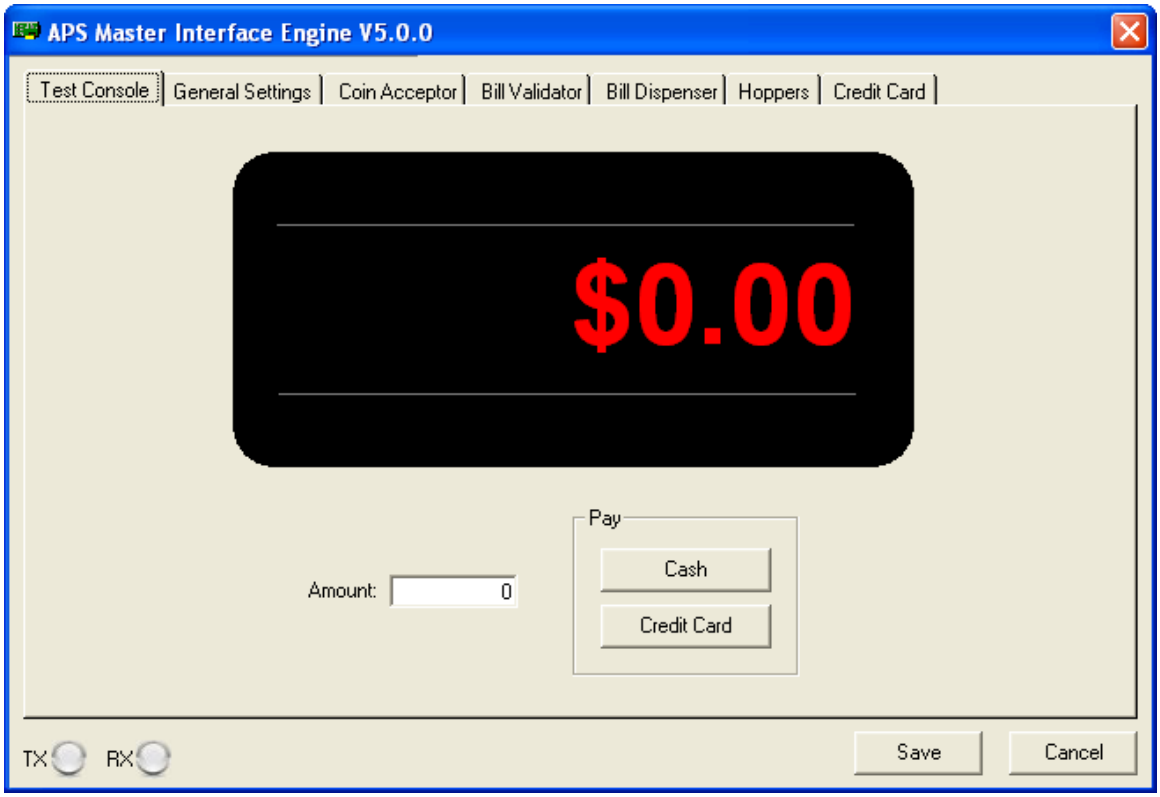
If all parameters are correct and your account is active the "On Line:" text will change to "Yes" with a green background, indicating that now you can start receiving payments with your account. All other settings will be filled automatically by the application.

If you want to check that the Pinpad Terminal is working correctly, click the "Read Card" button in the "Test Pin Pad" section, follow the instructions shown in the "Mensajes en Pantalla Pin Pad:". If everything is working correctly, your Credit Card number and name will be used to fill the "Número de Tarjeta:" and "Tarjetahabiente" fields under the "Test Pin Pad" section.

In order to print the result of the transaction, it is necessary to specify the "Vaucher Printer". The list of printers installed in the computer will be updated automatically in the selection menu.

4.1.8 Test Console

Once you have finished with the setup of your parameters you can use the Test Console to verify that your Bill Validator and/or Coin Acceptor are working correctly.



To test your equipment you just need to type the Amount of money to be charged in the "Amount" textbox, then click the "Cash" button. The APSMI Engine Console will activate the Bill Validator and/or Coin Acceptor so you can start inserting the money.

When you click the "Cash" button, the text in the button will change to "Stop Payment...". You can click on this button at any time to cancel the payment process.

Once the payment operation is in process, the Status Display will change to an active role displaying the status and balance of the amont due. The Status Display is divided in 3 sections:

a. The top section displays the amount of money due.
b. The middle section displays the credit or amount of money already paid.
c. The botton section display the status of the APSMI Engine Status.

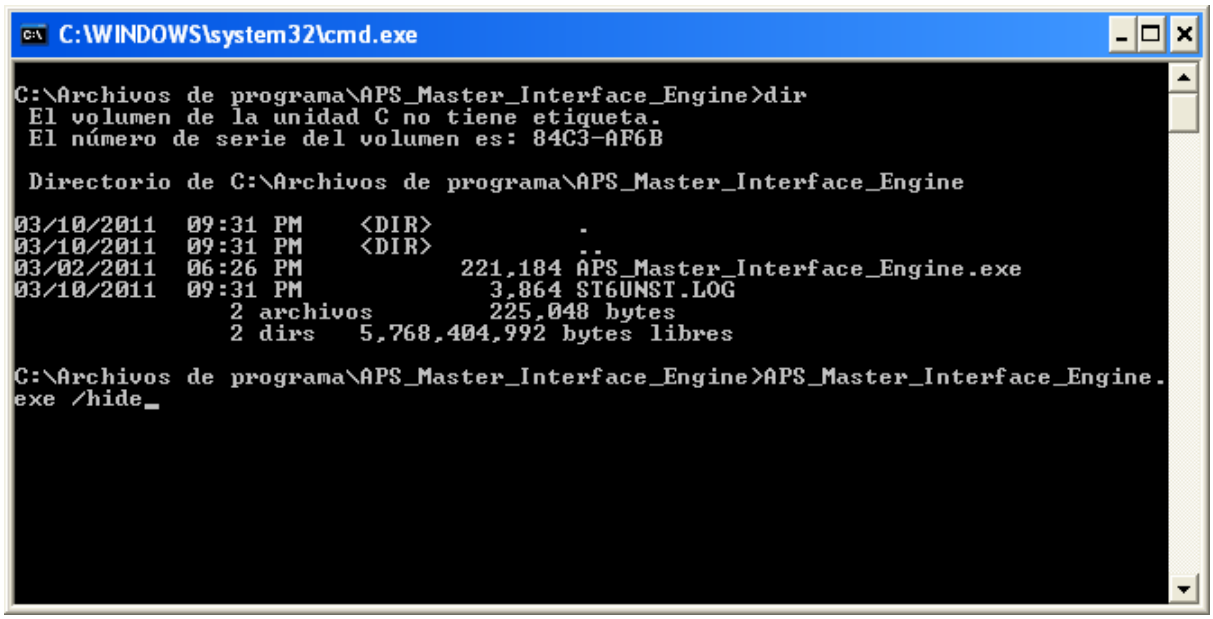
APSMI Engine Test Console is very usefull when you are writing your applications, you can always use it to debug your code and monitor the payment functions. When you integrate APSMI Engine to your application, this is the same software that will communicate with your devices, but the APSMI Engine will be hidden to the user.

4.2 APS Master Interface Engine Console "Hide"

The APS Master Interface Engine Console "Hide" is the same application described in the previous chapter, the only difference is that the application runs in the background without displaying any Forms. While your are using the APSMI Engine Console using the "Hide" parameter, your will be able to control the payment process using your Bill Validator and/or Coin Acceptor, but you won't be able to change the parameters.

Here an example of how you can call the APSMI Engine Console using a regular DOS line command with the “/hide” parameter.

Once you are programming your application, you need to find the right code to call the APSMI Engine Console from your selected platform. Check our SDK for APS Master Interface with a real example using Visual Basic code.

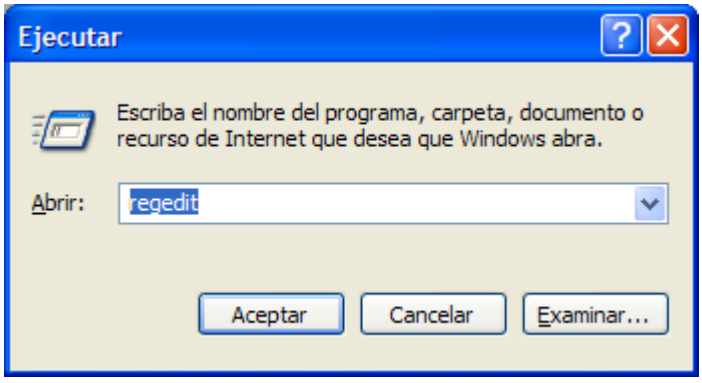

C:\WINDOWS\system32\cmd.exe
C:\Archivos de programa\APS_Master_Interface_Engine>dir
El volumen de la unidad C no tiene etiqueta.
El número de serie del volumen es: 84C3-AF6B
Directorio de C:\Archivos de programa\APS_Master_Interface_Engine
03/10/2011 09:31 PM <DIR> .
03/10/2011 09:31 PM <DIR> ..
03/02/2011 06:26 PM 221,184 APS_Master_Interface_Engine.exe
03/10/2011 09:31 PM 3,864 ST6UNST.LOG
2 archivos 225,048 bytes
2 dirs 5,768,404,992 bytes libres
C:\Archivos de programa\APS_Master_Interface_Engine>APS_Master_Interface_Engine.exe /hide

4.2.1 Windows Registry Settings for APSMI Engine Console

The Windows Registry is a database which stores settings and options for Microsoft Windows operating systems. It contains information and settings for hardware, operating system software, most non-operating system software, and per-user settings. The registry also provides a window into the operation of the kernel, exposing runtime information such as performance counters and currently active hardware.

APSMI Engine Console uses the Windows Registry database to save the application parameters and also to communicate with you application. By using this database we are able to support any programming language since the values are available from any platform.

Windows Registry can be accessed manually using the "Regedit" utility from Windows XP or Windows 7.

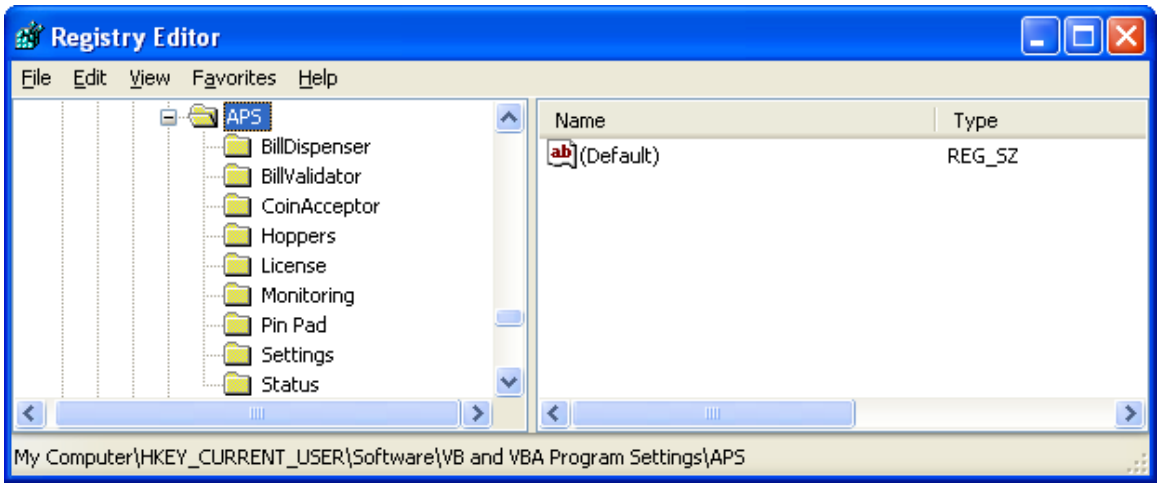


Once the Windows Registry editor is open, you can find the APSMI Engine Console parameters under the HKEY_CURRENT_USER directory in My Computer:

```
My Computer\HKEY_CURRENT_USER\Software\VB and VBA Program Settings\APS
```

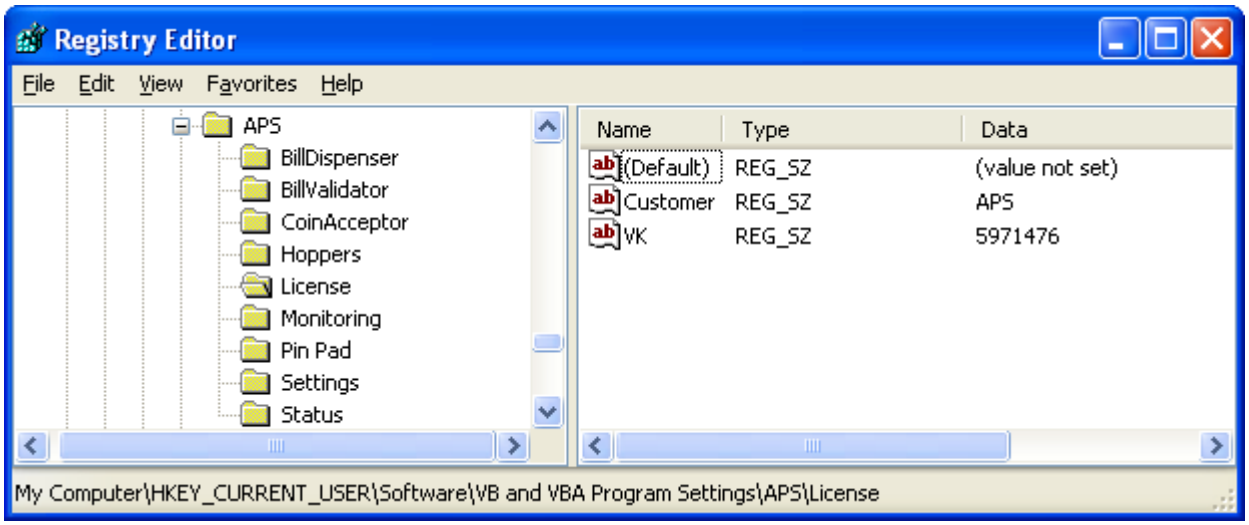
Note: The user name can be different from one computer to another, you can also search for the right path using the "Search" menu option typing "VB and VBA Program Settings" as the searched item.

APSMI Engine Console uses nine Windows Registry categories to storage all the parameters and variables to communicate with your applications: BillDispenser, BillValidator, CoinAcceptor, Hoppers, License, Monitoring, Pin Pad, Settings and Status.



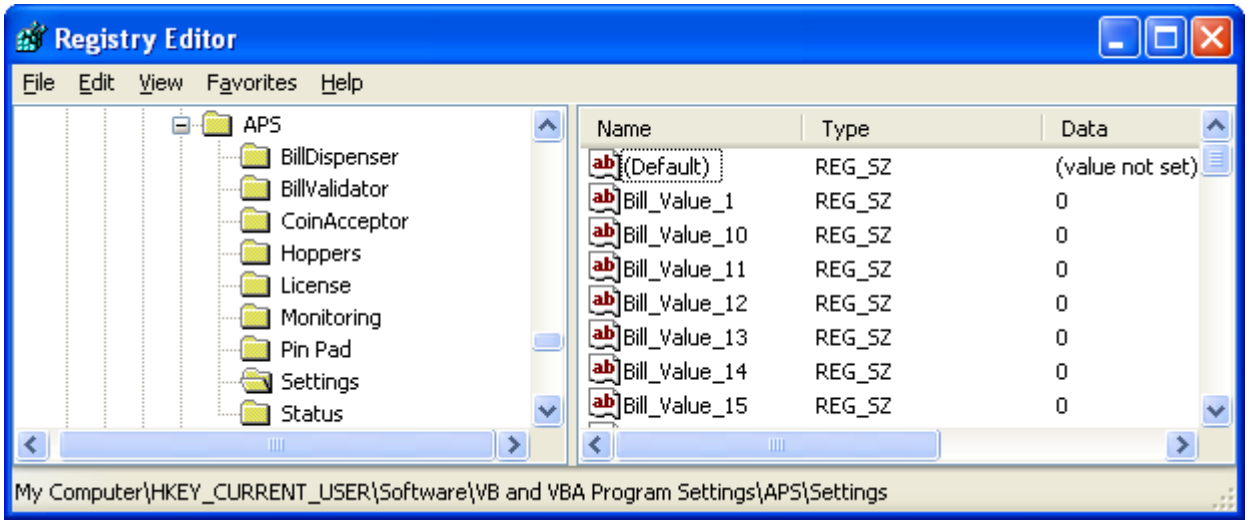
4.2.2 License Windows Registry

License Windows Registry is used to record the values used by the APSMI Engine Console validation software to authenticate the license number registered by the customer. As this value can be changed manually we don't recommend it because any mistake on typing the numbers can block you from using the APSMI Engine Console application.



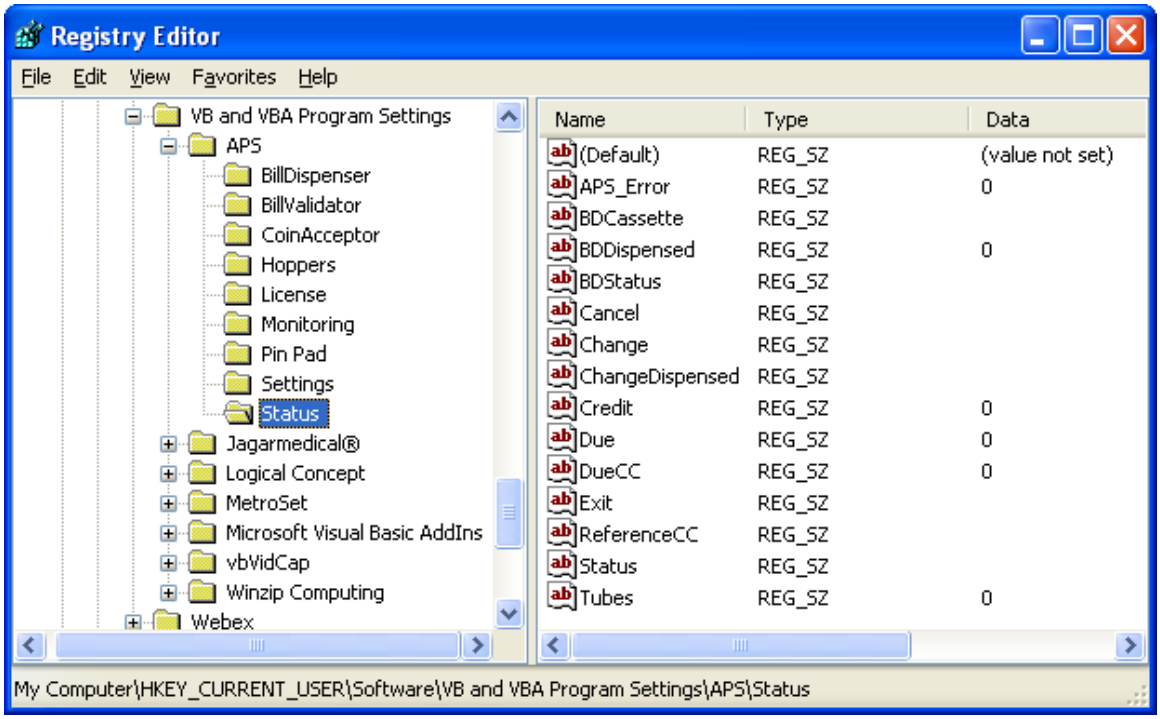
4.2.3 Settings Windows Registry

Settings Windows Registry is used to record the values used by the APSMI Engine Console to set the parameters of the Bill Validator and Coin Acceptor. As this values can be changed manually we recommend using the APSMI Engine Console described in Chapter 4.1



4.2.3 Status Windows Registry

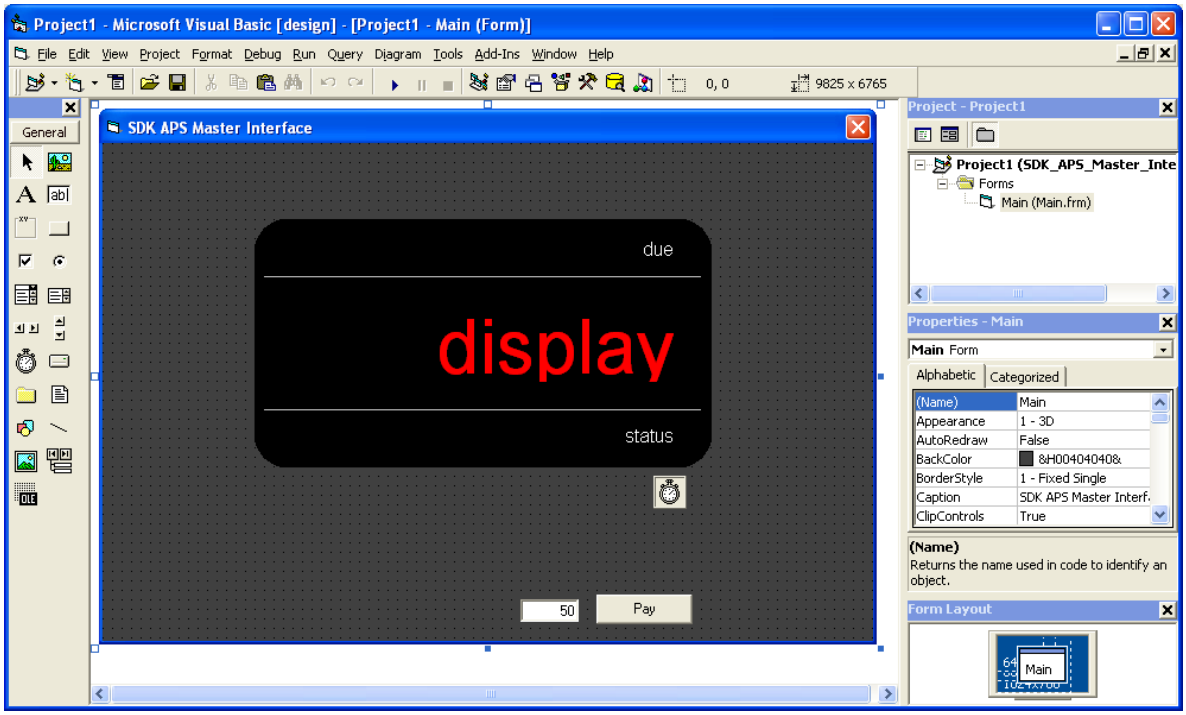
Status Windows Registry values are used to communicate the APSMI Engine Console with your application. While there are 14 variables under this section, only six (Due, DueCC, ReferenceCC, Change, Cancel, Exit) should be updated by your application and the remaining (APS_Error, BDCassette, BDDispensed, BDStatus, ChangeDispensed, Credit, Status, Tubes) will be automatically updated by the APSMI Engine Console.



4.3 SDK APS Master Interface – Main Form

Integrating the APS Master Interface Engine to your application is very simple. We have developed a Visual Basic sample application that can be used to explain how to control the payment systems connected to your machine.

The SDK APS Master Interface is distributed in a .zip file as described in chapter 3.1.3. The Visual Basic Project has one form named “Main.frm”.



4.3.1 Main Form elements: “due”

The Main Form has several labels that are used to display the current status of the payment process. The “due” Label is used to display the amount to be paid by the customer when the customer clicks on the “Cash” button.

This is a fix value that won’t change during the payment.

4.3.2 Main Form elements: “display”

The “display” Label is used to show the amount of money introduced into the Bill Validator and/or Coin Acceptor during the payment process. This value is not fix and will change every time a coin or bill is inserted.

4.3.3 Main Form elements: “status”

The “status” Label is used to show the current step on the payment process after the Pay Button is pressed. The APS Master Interface Engine will report 4 possible conditions: “Insert Coins or Bills…”, “Payment Completed”, “Transaction Cancelled”, “Dispensing change…”.

4.3.3.1 Insert Coins or Bills...

“Insert Coins or Bills…” status will be displayed after the Pay Button is pressed. If the setup is properly configured in this step the Bill Acceptor and/or Coin Validator should be active and ready to receive Bills and/or Coins.

4.3.3.2 Payment Completed

“Payment Completed” status is used to indicate that the user has completed the payment process. At this step the “due” and “credit” amounts have the same monetary value.

4.3.3.3 Transaction Cancelled

After they Cash Button is pressed to start the payment process, it will change the text displayed in the Button from “Cash” to “Cancel”.

If the Cancel button is pressed, it will stop the payment process and the “status” Label will display the “Transaction Cancelled” legend.

If the APS Master Interface is setup to dispense change, the application will return the credit amount using coins only.

4.3.3.4 Dispensing change...

“Dispensing change…” status is used to indicate that the Coin Acceptor is returning coins to the client. Dispensing change process time can vary depending on the amount to be returned.

4.4 SDK APS Master Interface – Visual Basic Code

As we explained in the previous section, the SDK APS Master Interface sample application has one form called "Main.frm". In this section we will explain the 4 "Subroutines" used to communicate the application with the "APS Master Interface Engine".

```
Option Explicit

Private Sub Form_Load()
Dim InitEngine As Double

'   Open APS Master Interface Engine
'   This Engine will perform all the functions and communication between your computer and
'   the payment systems: Bill Validator and/or Coin Acceptor
'   If you want to debug your application, you can ommit the /hide parameter to view the
'   APS Master Interface Engine Console.
    InitEngine = Shell("APS_Master_Interface_Engine.exe /hide", 1)

'   Reset "Regedit" variables
'   These variables are used to communicate your application with the APS Master Interface Engine
    SaveSetting "APS", "Status", "Due", "0"
    SaveSetting "APS", "Status", "Credit", "0"
    SaveSetting "APS", "Status", "Status", ""
    SaveSetting "APS", "Status", "Cancel", ""
    SaveSetting "APS", "Status", "Exit", ""

    display.Caption = Format(0, "currency")
    status.Caption = ""
    due.Caption = "DUE AMOUNT: " & Format(0, "currency")
End Sub

Private Sub Form_Terminate()
    SaveSetting "APS", "Status", "Exit", "1"
End Sub

Private Sub Pay_Click()
    If Pay.Caption = "Pay" Then
            SaveSetting "APS", "Status", "Due", Val(amountToPay.Text)
            Timer1.Enabled = True
            Pay.Caption = "Cancel"
        Else
            Pay.Caption = "Pay"
            SaveSetting "APS", "Status", "Cancel", "1"
            display.Caption = Format(0, "currency")
            status.Caption = ""
            due.Caption = "DUE AMOUNT: " & Format(0, "currency")
            Timer1.Enabled = False
    End If
End Sub

Private Sub Timer1_Timer()

    display.Caption = Format(Val(GetSetting("APS", "Status", "credit", "")), "currency")
    due.Caption  =  "DUE  AMOUNT:  "  &  Format(Val(GetSetting("APS",  "Status",  "due",  "")),
"currency")
    status.Caption = GetSetting("APS", "Status", "Status", "")

    If Val(GetSetting("APS", "Status", "due", "")) <= 0 Then
        Timer1.Enabled = False
        Pay.Caption = "Pay"
    End If

End Sub
```

4.4.1 Sub Form Load()

The “Sub Form Load()” is the first code executed when the application is launched. The “Shell” function is used to start the “APS_Master_Interface_Engine.exe” with the “/hide” parameter set as we described in chapter 4.2. The number “1” parameter of the “Shell” function is used to stop the execution of next steps until the “APS_Master_Interface_Engine.exe” is loaded.

```
Private Sub Form_Load()
Dim InitEngine As Double

'   Open APS Master Interface Engine
'   This Engine will perform all the functions and communication between your computer and
'   the payment systems: Bill Validator and/or Coin Acceptor
'   If you want to debug your application, you can ommit the /hide parameter to view the
'   APS Master Interface Engine Console.
    InitEngine = Shell("APS_Master_Interface_Engine.exe /hide", 1)

'   Reset "Regedit" variables
'   These variables are used to communicate your application with the APS Master Interface Engine
    SaveSetting "APS", "Status", "Due", "0"
    SaveSetting "APS", "Status", "Credit", "0"
    SaveSetting "APS", "Status", "Status", ""
    SaveSetting "APS", "Status", "Cancel", ""
    SaveSetting "APS", "Status", "Exit", ""

    display.Caption = Format(0, "currency")
    status.Caption = ""
    due.Caption = "DUE AMOUNT: " & Format(0, "currency")
End Sub
```

“SaveSetting” is the Visual Basic Function used to write into the Regedit variables. As we explained before, these variables are being monitored by the “APS_Master_Interface_Engine” application that is running in the background.

4.4.2 Sub Form Terminate()

The “Sub Form Terminate()” will request to stop the “APS_Master_Interface_Engine” application by Saving the value “1” into the “Exit” Regedit variable.

```
Private Sub Form_Terminate()
    SaveSetting "APS", "Status", "Exit", "1"
End Sub
```

4.4.3 Sub Form Pay_Click()

The “Sub Form Pay_Click()” is the action attached to the “Pay CommandButton” from the “Main.frm”. When the button is clicked the application will check the current legend on the button, based in this information will decide if the application should start the payment process or cancel it.

The payment process starts by setting the “Due” Regedit variable to a value greater than 0. At this moment, the APS Master Interface Engine will activate the Bill Validator and/or Coin Acceptor according to the parameters setup. If you want to process they payment using a Credit Card, then you will need to save the value in the “DueCC” veriable.

In order to monitor the payment process and know when the process is completed we use a “Timer” control. In this case our “Timer1” control is setup to cycle every 5ms once it is enabled.

```
Private Sub Pay_Click()
    If Pay.Caption = "Pay" Then
            SaveSetting "APS", "Status", "Due", Val(amountToPay.Text)
            Timer1.Enabled = True
            Pay.Caption = "Cancel"
        Else
            Pay.Caption = "Pay"
            SaveSetting "APS", "Status", "Cancel", "1"
            display.Caption = Format(0, "currency")
            status.Caption = ""
            due.Caption = "DUE AMOUNT: " & Format(0, "currency")
            Timer1.Enabled = False
    End If
End Sub
```

To notify to the APS Master Interface Engine that the payment process should Stop it is necessary to setup the “Cancel” Regedit variable to “1”. If the dispense change parameter is setup the current credit amount will be returned to the client.

4.4.4 Sub Timer1_Timer()

The “Sub Timer1_Timer()” will be running in cycles every 5ms to monitor the status of the “credit”, “due” and “status” Regedit variables. The information will be displayed in the “Main.frm” Text Labels. Once the “due” amount is equal or less than 0 the cycle stops.

```
Private Sub Timer1_Timer()

    display.Caption = Format(Val(GetSetting("APS", "Status", "credit", "")), "currency")
    due.Caption = "DUE AMOUNT: " & Format(Val(GetSetting("APS", "Status", "due", "")),
"currency")
    status.Caption = GetSetting("APS", "Status", "Status", "")

    If Val(GetSetting("APS", "Status", "due", "")) <= 0 Then
        Timer1.Enabled = False
        Pay.Caption = "Pay"
    End If

End Sub
```

4.5 Additional Functions

In addition to the basic functions mentioned in the previous chapter there are additional functions included in the APS Master Interface that can be used to increase the control of the cash transactions and payment processes.

4.5.1 Disable and enable bills at Runtime

As you already now, you can manually setup the bills that you want to use during the payment process. You can also perform this task during runtime, before you set the amount to be paid. Set the “BillTypeX_Enabled” value to “1” under the “BillValidator” registry values to allow the use of that bill type, use the value “0” to disable it. Then save the amount to be paid in “due”.

4.5.2 Change Dispensed after a cash transaction

After each transaction you can always check the value of the “CashDispensed” variable under the “Status” registry variables. This variable returns the actual amount dispensed in change, considering the coins dispensed by the Coin Acceptor, Coin Hoppers and Bill Dispenser. This function is updated in both manual and automatic change dispensing.

4.5.3 Manual Change Dispensing

While the APS Master Interfase software is an idle state you can manually dispense change by writing the amount of money in the “Change” variable under the “Status” registry variables. The system will use the enabled equipment for this task: Coin Acceptor and/or Bill Dispenser and/or Coins Hoppers.

If the “Enable Change” option under “Coin Acceptor” is disabled, the system will temporary activate the “Enable Change” parameter to dispense the money, once the operation is completed it will return the “Enable Change” variable to its original value.

When more than one equipment is used to dispense change, the APS Master Interface software will try to use the highest bill and/or coin available. If the equipment is enabled, the algorithm will try to use the Bill Validator first, followed by the Coin Acceptor and finally the Coins Hoppers.

4.5.4 APS Master Interface Startup Error

The APS Master Interface is a very robust and tested system, however there might be occasions where the APS Master Interface is unable to boot correctly, caused by a driver and/or hardware malfunction. If the system is unable to load it correctly it will report it saving a value “1” in the “APS_Error” registry variable under the “Status” section.

4.5.5 Cancel Cash Transaction without dispensing change

If for any reason you need to cancel the current Cash Transaction without dispensing change, you can do it by writing a value “2” in the “Cancel” registry variable under the “Status” section. Even if the Bill Dispenser and Coins Hoppers are enable this function will override their settings and not dispense any change. If you use the value “1” the system will cancel the transaction and dispense the current “Credit” amount.

4.5.6 Coin Tubes Quantity update after each transaction

The Coin Tubes amount is updated after each transaction in the “Tubes” variable under the “Status” section. However, this value is updated individually for each coin type in their assigned tubes also. You can check what is the quantity of coins per tube in the “tubeCoinQtyX” variable under the “CoinAcceptor” section of the registry variables. The type of coin is recorded under the “tubeCoinTypeX” under the same section.

4.5.7 Coin Acceptor and Bill Validator Error handling at Runtime

In case of any communication errors during Runtime between the APS Master Interface software and the Coin Acceptor or Bill Validator the systems will retry 3 times to recover it from the error, if the communication is not possible, the system will report the error using the “Status” variable under the “Status” section with the values “Error: Coin Acceptor” or “Error: Bill Validator”.

4.5.8 Setup Reference ID for Credit Card Transactions

If you want to process a payment using a Credit Card, you will need to write the amount to charge in the “DueCC” Regedit variable, under the “Status” section. Every Credit Card transaction must have a Reference ID for further reference in case of any dispute. You can create any reference number selection (Customer Account Number, Phone Number, etc...) and write it in the “ReferenceCC” Regedit variable before you write the amount to change in “DueCC”.

If you write a value in “DueCC” and “ReferenceCC” is empty, the APS Master Interface Engine will generate a random number, using a combination of the computer unique id values and the date and time when the transaction was completed. After the payment is completed or rejected, the “ReferenceCC” number will be erased.

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